WE CLAIM:

1. A method of determining the ratio of mass to charge of an ion comprising:

a. pulsed ionizing intact analyte ions from a sample to be analyzed;

b. simultaneously i.) damping said intact ions to reduce energy spread of said ions substantially without fragmentation, and

ii.) linearly accelerating said intact ions to provide a substantially continuous beam thereof; and

c. determining ratio of mass to charge of said ions.

2. A method according to Claim 1, wherein said generating comprises matrix-assisted laser desorption/ionization (MALDI).

3. A method as described in Claim 2, wherein said intact analyte ions resulting from step (a) are collected by spatially arranging a high pressure co-linear ion guide/accelerator sufficiently proximal to said ion generation to cause entry therein of a substantial number of said analyte ions in the absence of required ionic acceleration while permitting continued pulsed ionization.

4. A method as described in Claim 3, wherein said spatial arrangement includes locating said ion guide/accelerator at a distance from said ionization source of not greater than about 2 cm and fixing an aperture at an opposite end of said ionization source.

5. A method as described in Claim 4, wherein said distance is from about 0.1 mm to about 1 cm.

6. A method as described in Claim 5, wherein said distance is from about 0.8 mm to about 1.2 mm.

7. A method as described in Claim 4, wherein said aperture has a dimension of from about 0.1 cm to about 2 cm.

8. A method as described in Claim 7, wherein said dimension is of from about 0.2 cm to about 1.0 cm.

9. A method as described in Claim 8, wherein said dimension is about 0.3 cm.

10. A method as described in Claim 1, wherein said simultaneous damping and accelerating comprises subjecting said intact analyte ions to damping gas through a linear path defined by said ion guide while linearly accelerating said ion through said linear path.

11. A method as described in Claim 10, wherein said ion guidance is provided by a multipole ion guide within a pressurized gas environment.

12. A method as described in Claim 11, wherein said gas is maintained at a pressure of from about 0.1 mTorr to about 10 Torr.

13. A method as described in Claim 12, wherein said pressure is from about 10 mTorr to about 1000 mTorr.

14. A method as described in Claim 13, wherein said pressure is from about 50 mTorr to about 80 mTorr.

15. A method as described in Claim 11, wherein said multipole ion guide comprises at least about four (4) ion guide rods.

16. A method as described in Claim 11, wherein said multipole ion guide comprises guide rods having a length of from about 1 cm to about 100 cm.

17. A method as described in Claim 16, wherein said length is from about 10 cm to about 40 cm.

18. A method as described in Claim 17, wherein said length is from about 18 cm to about 22 cm.

19. A method as described in Claim 11, wherein said multipole ion guide comprises guide rods having a greatest cross-sectional dimension of from about 0.1 cm to about 2 cm.

20. A method as described in Claim 19, wherein said dimension is from about 0.2 cm to about 1.0 cm.

21. A method as described in Claim 20, wherein said dimension is from about 0.5 cm to about 0.8 cm.

22. A method as described in Claim 11, wherein said linear acceleration is provided by charged accelerator rods arranged co-linearly with said multipole ion guide to provide linear acceleration of said substantially continuous ion beam toward said mass to charge determination.

23. A method as described in Claim 22, wherein there are at least about four (4) accelerator rods.

24. A method as described in Claim 22, wherein said rods have a length of from about 1 cm to about 100 cm.

25. A method as described in Claim 24, wherein said length is from about 10 cm to about 20 cm.

26. A method as described in Claim 25, wherein said length is from about 16 cm to about 20 cm.

27. A method as described in Claim 22, wherein the greatest cross-sectional dimension of said rods is from about 0.01 mm to about 2 cm.

28. A method as described in Claim 27, wherein said dimension is from about 0.01 cm to about 1 cm.

29. A method as described in Claim 28, wherein said dimension is from about 0.25 cm to about 0.50 cm.

30. A method as described in Claim 1, wherein determining said ratio of mass to change ratio comprises subjecting said ions to ion trap spectroscopy.

31. A method as described in Claim 1, wherein said sample has an amount of analyte ions 10^{-20} mole to about 10^{-9} mole.

32. A method as described in Claim 31, wherein said amount is from about 10^{-18} mole to about 10^{-15} mole.

33. A method as described in Claim 1, wherein a time period for conducting said analysis is not greater than about 10 minutes.

34. A method as described in Claim 33, wherein said time period is not greater than about 1 second.

35. A method as described in Claim 1, which further comprises directing ions resulting from said simultaneous damping and accelerating to a second ion guide whereby continuity of said ion beam is enhanced.

36. A method as described in Claim 35, wherein said second ion guide comprises a multipole ion guide having at least about eight guide rods.

37. A system for determining the ratio of mass to charge of an ion comprising:

a. a pulsed ionizer which generates intact analyte ions from a sample of matter to be analyzed;

b. a high pressure co-linear ion guide/accelerator interfaced with said ion source for non-accelerated receipt of intact ions of said sample, which simultaneously dampens and linearly accelerates intact ions in the substantial absence

of fragmentation of said ions to provide a substantially continuous beam of said intact ions for mass analysis; and

c. a mass analyzer connected to said ion guide/accelerator for receipt of said beam of ions which determines the mass to charge ratio of said intact ions.

38. A system as defined in Claim 37, wherein said pulsed ionizer is a matrix-assisted laser desorption/ionization (MALDI) device.

39. A system as defined in Claim 37, wherein said high pressure co-linear ion guide/accelerator comprises a multipole rod set and an accelerator rod set arranged co-linear in the presence of high pressure gas.

40. A system as defined in Claim 39, wherein said high pressure gas is maintained at a range from about 0.1 mTorr to about 10 Torr.

41. A system as defined in Claim 40, wherein said range of pressure is from about 10 mTorr to about 1000 mTorr.

42. A system as defined in Claim 41, wherein said pressure is from 50 m Torr to about 100 m Torr.

43. A system as defined in Claim 39, wherein said ion guide/accelerator is arranged spatially at a distance of not greater than about 2.0 cm from said source of ions for entry of analyte ions and includes an aperture at an opposite end of said source of ions.

44. A system as defined as in Claim 43, wherein said distance is from about 0.1 mm to about 1 cm.

45. A system as defined in Claim 44, wherein said distance is from about 0.8 mm to about 1.2 mm.

46. A system as defined in Claim 43, wherein said aperture has a dimension of from about 0.1 cm and to about 2 cm.

47. A system as defined in Claim 46, wherein said dimension is from about 0.2 cm to about 1.0 cm.

48. A system as defined in Claim 47, wherein said aperture is about 0.3 cm.

49. A system as defined in Claim 39, wherein said multipole rod set comprises at least about four (4) rods.

50. A system as defined in Claim 39, wherein said each of said multipole rods has a length in a range from about 1 cm to about 100 cm.

51. A system as defined in Claim 50, wherein said length is from about 10 cm to about 40 cm.

52. A system as defined in Claim 51, wherein said length is from about 18 cm to about 22 cm.

53. A system as defined in Claim 39, wherein each of said multipole rods has a largest cross-sectional dimension in a range from about 0.1 cm to about 2 cm.

54. A system as defined in Claim 53, wherein said dimension is from about 0.2 cm to about 1 cm.

55. A system as defined in Claim 54, wherein said dimension is from about 0.50 cm to about 0.8 cm.

56. A system as defined in Claim 39, wherein said accelerator rod set comprises at least four (4) rods arranged co-linearly with said multipole rod set.

57. A system as defined in Claim 39, wherein each of said accelerator rods has a length of from about 1 cm to about 100 cm.

58. A system as defined in Claim 57, wherein said length is from about 10 cm to about 40 cm.

59. A system as defined in Claim 58, wherein said length is from about 16 to about 20 cm.

60. A system as defined in Claim 39, wherein each of said accelerator rods has a largest cross-sectional dimension of from about 0.1 mm to about 2 cm.

61. A system as defined in Claim 60, wherein said dimension is from about 0.1 cm to about 1 cm.

62. A system as defined in Claim 61, wherein said dimension is from about 0.25 cm to about 0.5 cm.

63. A system as defined in Claim 37, which further comprises a second multipole ion guide situated to receive said ion beam from said ion guide/accelerator and further direct said beam to said mass analyzer.

64. A system as defined in Claim 63, wherein said second multipole ion guide comprises at least about eight guide rods.

65. A system as defined in Claim 37, wherein said mass analyzer has an ion trap and a detector.

66. A system as defined in Claim 65, further comprising a second ion guide/accelerator positioned between the ion trap and the detector.